

UTC Project Information	
Project Title	Evaluation of Ultra-wideband Radio for Improved Pedestrian Safety at Signalized Intersections
University	University of Idaho
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Funding Source(s) and Amounts Provided (by each agency or organization)	University of Washington PacTrans \$51,000 University of Idaho \$51,000
Total Project Cost	\$102,000
Agency ID or Contract Number	DTRT13-G-UTC40
Start and End Dates	January 15, 2015– September 16, 2016
Brief Description of Research Project	<p>The goal of this project is to increase the safety of signalized intersections for pedestrians with special needs due to limited mobility or vision.</p> <p>The research outcomes and technology developed under this proposal can be applied to existing intersections throughout the United States without significant changes to the infrastructure other than additional electronics.</p> <p>The University of Idaho has a long tradition of research into improving pedestrian safety and accessibility at signalized intersections and many of the outcomes have been incorporated into commercial products.</p> <p>Additional research has investigated the use of GPS and Bluetooth communication for pedestrian navigation and guidance with some promising results. However, these technologies are limited in their ability to track a pedestrian along the crosswalk with sufficient accuracy.</p> <p>We propose to investigate the performance of ultra-wideband radio for locating and tracking pedestrians as they progress through a signalized intersection.</p>

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>Our experiments demonstrate that under ideal conditions it is possible to determine the location of a UWB transmitter with sufficient accuracy, a maximum position error of approximately 15 cm from the direction of travel. However, the experiments could have been improved in a number of ways, including selection of the center frequency and surveying of anchor positions. What is left unknown is the distribution of position estimates for each test point, how the position estimate varies with time, and the time required to produce an estimate relative to pedestrian walk time. Insight into both of these questions could be determined from further analysis of the log files that were collected. The manufacturer claims that localization of an object can be accurately estimated at speeds up to 5 m/s.</p>
<p>Impacts/Benefits of Implementation (actual, or anticipated)</p>	<p>If signalized intersections were equipped with UWB transceivers connected to the traffic controller and special needs pedestrians were provided with the same, either as a separate device or integrated with their smartphone, then it would be possible to track pedestrians as they cross the intersection and adjust the signal timing as needed.</p> <p>Furthermore, under Vehicle to Infrastructure technology it would be possible for the intersection to notify approaching vehicles of a potential conflict, significantly improving pedestrian safety.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<p>Contact PACTRANS www.pacTrans.org</p>